Part 1 Introduction

During the period from August 97 to August 98, the Working Group on Environmental Economics made studies on the planned projects on the basis of the work done by the WG during the first phase. These projects are as follows:

- Green Taxation: theory, international practice and relevance to China
- Environmental Accounting
- Economic Instruments for industrial Pollution Control in China
- Sustainable Agriculture
- Biodiversity
- Fisheries

The second session of the WG was held in Harbin, Heilongjiang Province, July 1998, discussing the research results on above projects. The main results on Green Taxation and Economic instruments for industrial Pollution Control in China are concluded in part 2 and part 3 of this report.

Part 2 Study on Green Taxation: Theory, International Practice and Relevance to China

The object of this study is threefold:

(a) to review the state of the art in environmental taxation worldwide, both in terms of theory and practice with detailed analysis of the most promising models, instruments and experience;

(b) to review the status and performance of environmental taxation in China, including recent assessments and proposed improvements by the State Environmental Protection Administration, the World Bank and others;

(c) to identify opportunities and assess the potential for expended environmental taxation in China, both at the micro level(optimal pricing to ensure efficient resource use) and at the macro level(fiscal reform to integrate environment and economy).

2.1 Rationale for Environmental Taxation

- Full-cost pricing (marginal opportunity) of resources, goods services requires that all costs, present and future, internal (private) and external to the users that are incurred by society during production and consumption are incorporated and fully covered by the price of the goods or service. Environmental taxes are one of the principal economic instruments that are used to effect full-cost pricing: to bring the gap between private and social cost. To do this, the tax should be set exactly equal to the marginal environmental damage corresponding to the socially optimal level of pollution. Environmental taxes can be levied on the pollutant itself
(effluents or emissions taxes) or on final products associated with environmental externalities (product taxes).

- Environmental taxes, if properly structured, can become a major thrust of fiscal policy reform. Conventional taxation throughout the world taxes work, income, savings, investment, and value added and leaves untaxed (even subsides) leisure and consumption, resource depletion, and pollution. If a reform of fiscal system that would reduce conventional taxes and replace them with environmental taxes, so a s to leave the total tax burden unchanged, would probably bring a better environment and stimulate economic growth as well (therefore called double dividend).

- Although there is a rather heated debate as to whether a revenues neutral environmental taxes would actually result in a double dividend, it is agreed that broad-based environmental taxes with incidence on low marginal tax inputs that replace revenues obtained from taxes with high marginal tax rates are likely to result in zero or negative cost (benefit) to the economy. While an overnight shift from "taxes on value" to "taxes on vice" is unlikely and potentially disruptive, gradual shift towards environmental taxes would be a move in the right direction. For example, income taxes could be reduced and the lost tax revenues replaced by product taxes on gasoline, chemicals, and other polluted products.

2.2 International Experience with Environmental Taxes

- The introduction of environmental taxation especially in the form of energy taxes has accelerated during the past the years among OECD countries and some developing countries. While all OECD countries tax pollution one way or another, tax rates have been low aiming to collect revenues rather than to provide incentive s for changing behavior. The 1990s have witnessed an effort led by the Nordic counties and Germany to increase environmental tax rate in general to more meaningful levels, and the introduction of taxes on carbon dioxide, sulfur and nitrogen oxide, etc. The performance of environmental taxes in several European countries are evaluated and concluded that their environmental effectiveness was easier to document than their incentive effects (incentives for producers and consumers).

- As for resource taxation, some counties, such as the Philippines, get more than half of the rents through successful reforms especially of the forest sector policies. Indonesia has been particularly successful in capturing rents from petroleum and mineral extraction.

- Despite their great potential, both as incentives for improved environmental behavior and generators or revenues for financing sustainable development investment, environmental taxes have not expanded as rapidly and as widely as it was hoped because of the political cost of higher taxes and concerns about their effect on competitiveness and distribution. Another concern has been the institutional and administrative requirements of environmental taxes imposed on emissions that are difficult to monitor.

- European countries have used tax differentiation and its variants as a transitional policy to speed up the implementation of regulation of pollution products. These measures have two potential applicabilities to China: (a) a differential VAT (value added tax) between environmentally friendly and unfriendly products; (b) a reduction in the annual road tax on cars and an increase in the indirect tax on car fuels.
• Studies has shown that if taxes with high marginal rates are chosen to be replaced by environmental taxes that are broad-based (e.g. energy taxes) and whose incidence falls on factors with low marginal excess tax burden, "double dividend " may result consisting of higher GDP and lower environmental damages. For example, Statistics Norway has estimated that raising additional revenues through environmental taxes on gasoline, mineral oil or CO2 would result in a negative cost to the economy compared to a high and positive cost for conventional taxes including income and value added taxes, It is expected to see more countries introducing environmental taxes in the future.

2.3 Current Environmental Taxation in China

There are three major categories involved in the reform of environmental taxation in China: fiscal system, the pollution levy system and user charges.

2.3.1 The Fiscal System

China's fiscal system has undergone significant changes and reforms in the 1990s. The fiscal reforms instituted in 1994 have introduced a taxation system, which is dominated by receipt taxes and income taxes. Taxes in the new fiscal system, primary in terms of environmental relevance are: the excise tax, the value added tax, the resource taxes, property taxes (the vehicle and ship use tax), and the taxes on special conduct on behavior (especially the tax for guiding investment in fixed assets and the City and Town Construction and Maintenance tax). The excise tax is imposed on five energy and energy-related products: gasoline, diesel oil, motorcycles and cars, but is does not apply to coal. The resource tax applies to seven types of mineral resource, including coal, crude oil and natural gas, with a low tax rate that have resulted in modest tax revenue and limited effectiveness as an economic instrument. The excise tax and value added tax provide s cope for environment-based tax differentiation.

2.3.2 Pollution Levy System

China introduced the pollution levy system in 1979, and has made great achievements especially in terms of that it raises the environmental awareness of enterprises and the level of environmental investments in pollution treatment. However, the levy system suffers from several weaknesses:

(a) The low rate of the pollution charge (significantly below the marginal cost of abatement) does not provide incentive for enterprises to treat of reduce pollution; and its increase has lagged behind the inflation rate;

(b) The non-compliance penalty nature of the charge does not provide on-going incentives for pollution reduction and innovation, while its assessment only on the density of the pollutant most exceeding the standard, perverse incentives for dilution and pollutant substitution.

(c) The economic efficiency of the levy system is further compromised by the lack of differentiation according to the quality of the local environment and the natural capacity.
(d) The charge system is ill suited to and only erratically applied to the rapidly growing sector of township and village enterprises.

(e) The recycling of revenues to charge-paying enterprises in the form of pollution treatment subsidies reduce the incentive for polluters to change their behavior.

2.3.3 Integrating Environmental Taxes into Fiscal Reform

- China is undergoing unprecedented reform in at least three areas relevant to environmental taxation: institutional reform, fiscal reform, and environmental policy reform (especially of the levy system). This is a particularly opportune time to consider streamlining the current disparate system of pollution charges and fees and environment related taxes and integrating them into an internally consistent and economically efficient environmental taxation system.
- Despite the apparent appeal of integrating environmental taxes into the fiscal system, environmental taxes are not necessarily compatible with fiscal reforms that aimed to simplify the tax system by reducing the number of taxes and tax rates. In order to reconcile environmental taxes with fiscal reform, the following guidelines need to be observed: (a) avoid designing sophisticated environmental taxes that reflect closely environmental damage (use very broad measures of damage); (b) limit the number of new rates and taxes to a minimum by balancing administrative efficiency against economic efficiency; (c) recycle the revenues from environmental taxes to reduce the tax rates of existing distortionary taxes such as taxes on labor and capital.
- Environmental taxes have significant distribution impacts, which depend on local circumstances, location, time horizon and how the revenues from environmental taxes are spent. These impacts may be addressed through (a) differential taxation (lower taxes on necessities), (b) retraining, compensation of impacts and gradual implementation, (c) revenue neutrality i.e. commensurate reduction of other taxes with high incidence on the poor and (d) increased progressively elsewhere in the tax system.

Part 3 Economic Instruments for Industrial Pollution Control in China

3.1 The Existing Situation

3.1.1 Macro Policy Context

- Economy-wide policies, both sectoral and macroeconomic, often have significant environmental effects. Some of these policy reforms which usually promote efficiency of reduce poverty, may also be beneficial for the environment, but some may have negative environmental effects which call for complementary environmental measures to remedy. In the case of industrial pollution, such environmentally focused remedial actions would include both market-based approaches (like Pigouvian taxes on environmental externalities, or allocation of pollution rights coupled with marketable permits), as well as non-market methods (such as command-and-control techniques, or better definition of property rights).
- In particular, price reforms in the energy sector in China are likely to have a strongly positive impact on the environment. Water resource pricing also
still needs reform and would have benefits in terms of both the quantity and quality of water. On the whole, structural reform in the Chinese industrial sector is likely to strengthen the policy context for the environment.

- A wide range of economic instruments can be used in environment management, and some of them are used in China. The key to policy formulation must be to identify packages of instruments that can complement each other. In China, the links between economic policy and environmental concern are probably stronger at a macro level than a micro one. It is at the micro level the implementation of economic-environmental policy that the greatest reforms and enhancement are needed.

3.2.1 Industry and the Environment

Analysis of the industrial sector and its impacts on the environment has three key conclusions.

- The environmental performance of larger enterprises is tending to improve. Pollution intensity in this sector is declining, and some discharges, such as industrial wastewater and soot have declined substantially in absolute terms since 1989.
- The environment performance of the TVIE (township and village industrial enterprise) is declining in both absolute and relative terms. The TVIE sector has grown fast-employment in the sectors increasing at around 5% per year since 1989, and out-put increasing even more rapidly (43.9% per year form 1989 to 1994 in current price terms); however, environmental emissions have increased over the same period at 3.4% pa (SO2) and 30.8% pa (solid waste generated). Exiting policy instruments for this sector are clearly failing to deliver.
- Industry is not the only sector with polluting discharges and certainly not the only sector with severe impacts on ambient environmental concentrations. Other pollution's, such as municipal wastewater discharges, emissions from domestic stoves, small industries and vehicle are playing an increasingly large role in poor urban environmental quality.

3.1.3 Weakness in the System

- Investment in environmental protection overall has failed to keep pace, at a macro level, with gross fixed capital formation in the country. In fact, environmental investment has declined steadily from 3% of total fixed investment in 1990 to 1.8% by 1995. Under the technology renewal fund 7% of new investment should be earmarked for the environment, but in practice the share used for environmental protection is around 2-3%.
- The pollution levy system has contributed substantially to environment improvement in China. However, it still has weakness in terms of structure, implement ion and institution in the system, the structural weakness is the fact that the charge is levied only on discharges in exceedance of standards; in terms of implementation, the charge rate fails to keep pace with inflation, and the coverage in the TVIE sector is extremely weak; at the institutional level, the main problem is that since EPBs are founded from fines for non compliance with the pollution levy, there is some scope for abuse for abuse of the system.
• The Total Amount Control (TAC) has been introduced by the government in recognition of the continuing deterioration of environmental quality and the realization that even if concentrations of discharges are controlled environmental quality can get worse. While in theory TAC has some advantages it has considerable difficulties, such as that in the initial allocation of emissions, it's extremely data intensive, and the high administratively demanding.

3.2 Recommendations on Core Policy

3.2.1 The Pollution Levy System

• Levy charges on pollution emissions, not just that in exceedance. This has two major advantages. First it is more economically efficient since most emissions impose some externality at a level the standard as well as above it. Second, this recommendation would reduce the need for measurement.

• Extend the effective coverage of the pollution levy across all scales of industry, but maintain a low charge rate. While at a theoretical level it would be desirable to levy charges based on some combination of the marginal damage cost and marginal abatement cost, it would be more practicable to extend the effective coverage of pollution levy system across all industrial establishments, whether large scale enterprises, SOE, TVIE or SME, but retain for now a low rate of charge. Research has suggested that there is a positive impact form the charge, even through it is below the marginal abatement cost at the desired level of emission. All emitters should be included—municipal wastewater treatment plants, power station, local heating and heating system from institutions such as colleges or hospitals. The actual level of charge can of course be increased over time.

• Differentiate the charge structure for large enterprises and the rest. The pollution levy could be structured in two tiers: the first tier that deals with large enterprises, would follow the current pattern, but would be levied on all polluting discharges and on all the pollution substances. The second tier would be much simplified with standard charge rates based on emission coefficients for each industry sector, based on the annual registrations made by industries with the industrial agencies in charge where industries are required to register and state their expected output.

• Structure the charge for larger enterprises to offer very clear incentives for improved environmental performance. For example, if an enterprise makes a commitment to reduce emission by a given point in time, then the charge rate would be reduced until the work is completed, and on completion would be fully refunded to the enterprise. In addition, there could be some modifications to the application and administration of the revenues. For example, EPBs should introduce administrative cost recovery charges that explicitly reflect the cost incurred in carrying out various regulatory functions.

3.2.2 pollution Discharge Permits and Total Amount Control (TAC)

• The full introduction of TAC in China is excessively demanding from the administrative point of view, but if it is introduced with insufficient information and inadequate institutional structure, it could have very little impact on environmental performance in general.
• TAC offers a potentially powerful policy tool to address the issue of acid emissions from long distance acid deposition and water pollution in well-defined water bodies. This TAC and emission trading could be effectively introduced for controlling emissions to the "3 lakes" (Lake Tai, Dianchi and Lake Chao) and the "2 regions" - the acid rain and SO2 pollution control areas.

• For the wide application of TAC, a longer time frame should be contemplated to ensure that the quantitative controls take into account the impacts of emissions and all emissions are brought into the quantitative framework.

3.3 Other Enabling Policies

• Financing environmental investment

The fund from the Three Synchronizations and the TRR (Technology Renewal & Renovation) should increase to a target proportion of the total investment, and its investment should has some flexibility in order to balance the emphasis on end of pipe pollution abatement and better process management or waste minimization techniques. The funds should be used as loans for environmental investment. In addition to pollution abatement, loans should be available for the introduction of cleaner technology, for support of training and management programs; loans should also be made available to TVIEs.

• Integration of economic analysis with environmental planning

The capability in environmental economics and the application of economic think to environment concerns need to be strengthened and allowed to support environmental policy formulation. The role of economics is also important in the wider application of cost benefit analysis to policies and to problems. It is necessary to integrate the Ministry of Agriculture and their responsibility for TVIEs into environmental management in the same way as SEPA/EPBs are working with Ministry of Industry and Technical Co-operation.

• Increased focus on environmental management of TVIEs

This dynamic sector must be brought into the framework of environmental management. Traditional command and control instruments have failed to address the problems associated with this sector, and it is important that the application of economic instrument is applied. Pollution charges may well be the most straight forward. Research and analysis based on case study are essential in order to devise effective mechanisms for improving environmental management in TVIEs.

• Emphasis on supporting policies

The incentive structure proposed above-the reform of the pollution levy system and of financing through the revenues raised-would help to support the use of complementary policy tools such as information and disclosure, cleaner production, waste minimisation, etc. Cost recovery charging for shared waste treatment is obviously important for small and medium-size enterprises.
Part 4 Other Projects and Policy Recommendations

- Fisheries. In view of the result of case study on Sustainable Usage of Fisheries at Fujian Seacoast Area, it is concluded that over-fishing is a very serious problem in China. The main reason is that the user charges on fishery resource are significantly below the real marginal user cost. So the establishment of user share system on fishery and levy higher user charges on unusual fishes will be one of the practical measures to protect fishery resource.

- On projects of Sustainable Agriculture, Biodiversity, Environmental Accounting, etc, the WG has made cooperative research efforts with other WGs, such as Sustainable Agriculture, Biodiversity, Energy, Clean Production, and these WGs have made their contribution to the projects.

Part 5 Next Year’s Working Plan

It is agreed that during the next year, major emphasis will be on the following topics:

- Environmental Taxation. This will be built upon the work now being completed on Green Taxation and Economic Instruments for Industrial Pollution Control in China. Specific items to be included will be:

  (a) International comparison of different environmental policy instruments;

  (b) A special review of international experience of tradable permits, and a study of existing tradable permit schemes in China and their relevance for possible application not only to pollution but also fisheries, grasslands, water, etc;

  (c) A study of ways to reform the existing pollution levy system. This component will aim at making recommendations about how to integrate environmental taxation into overall fiscal policy, with concern not only for efficiency but also its distribution consequences;

  (d) Impacts of green taxation in China, using a macroeconomic model;

9e) Research on the MOC of CO$_2$ emission control in China.

- Grasslands. This study will be a complement to the on-going study on sustainable rice production, and, as in that study, also be based upon the use of MOC pricing analysis.

- In addition to the above, on going studies on biodiversity and sustainable agriculture will be completed. By the time of the next working group meeting, we should be in a position to start preparing a synthesis document of our work done so far, with explicit policy recommendations that can be presented to the full Council later in 1999. However, because of its more speculative nature, the green accounting work at both national and firm levels, will probably not be included in this document.